



## Course Title: Compilers and Languages

Sheet #2 2015/2016

1. Describe the language denoted by the following regular expressions:

- a)  $0(0/1)^*0$
- b)  $((\varepsilon/0)1^*)^*$
- c)  $(0/1)^*0(0/1)(0/1)$
- d)  $0^*10^*10^*10^*$
- e)  $(00/11)^*((01/10)(00/11)^*(01/10)(00/11)^*)^*$

2. Write regular definitions for the following languages:

- a) All strings of digits with no repeated digit.
- b) All strings of digits with at most one repeated digit.
- c) All strings of 0's and 1's with an even number of 0's.
- d) All strings of 0's and 1's with an odd number of 1's.
- e) All strings of 0's and 1's that do not contain the substring 011.
- f) All strings of 0's and 1's that do not contain the subsequence 011.
- g) All binary strings that do not begin with 11.
- h) All strings representing odd binary numbers.
- i) All strings of letters that contain the five vowels (a, e, i, o, u) in order.
- j) Comments consisting of string surrounded by /\* and \*/ without an intervening \*/ unless it appears inside the quotes " and ".

3. How many distinct strings are in the language of the regular expression:

$$(0+1+\varepsilon)(0+1+\varepsilon)(0+1+\varepsilon)$$

4. The language of the regular expression  $(abab)^*$  is equivalent to the language of which the following regular expressions? (Check all that apply).

- i.  $(aba(baba)^*b)^+ \varepsilon$
- ii.  $(ab(abab)^*ab)^+ \varepsilon$
- iii.  $(a(ba)^*b)^+ \varepsilon$
- iv.  $(ab)^*$

5. Given the following lexical specification:  $(00)^*01^+10^+$

Which strings are NOT successfully processed by this specification? (Check all that apply).

- i. 0111110
- ii. 01100110
- iii. 0001101
- iv. 01100100

Best wishes

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